(12) UK Patent Application (19) GB (11) 2 297 473 (13) A

(43) Date of A Publication 07.08.1996

(21) Application No 9601631.6

(22) Date of Filing 26.01.1996

(30) Priority Data
(31) 9500387 (32) 02.02.1995 (33) SE

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(51) INT CL[6]
A41B 13/04 , A61F 13/15

(52) UK CL (Edition O)
A3V V1B38 V52

(56) Documents Cited
GB 2248390 A WO 93/12746 A1

(58) Field of Search
UK CL (Edition O) A3V V1B38 V52
INT CL[6] A41B , A61F
ONLINE:WPI

(54) METHOD OF ELASTIFYING A SUBSTRATE BLANK

(57) A method of elastifying a non-woven or plastics jacket or substrate of a nappy, sanitory brief, incontinence garment or other pants-type article in its unassembled hour-glass form, arranged end-to-end in a longitudinal web, comprises: stretching a web length of elastic net, film or elastomeric non-woven material, which is rectilinear in its unstretched state, transversely but not longitudinally at the two end portions 13 which will form the waist, stretching said length of elastic net, film or elastomeric non-woven material longitudinally but-not-transversely at the intermediate crotch portion 14 therebetween, whereby the net or film will naturally assume the desired hour-glass shape of the jacket to be elastified, then bonding the stretched net or film in its hour-glass shape to the jacket 5. Alternatively two parallel lengths of elastic material may be bonded to the substrate or the substrate may be slit longitudinally in the crotch portion before attaching one or two absorbent pads thereto (Figs 5 to 8, not shown).

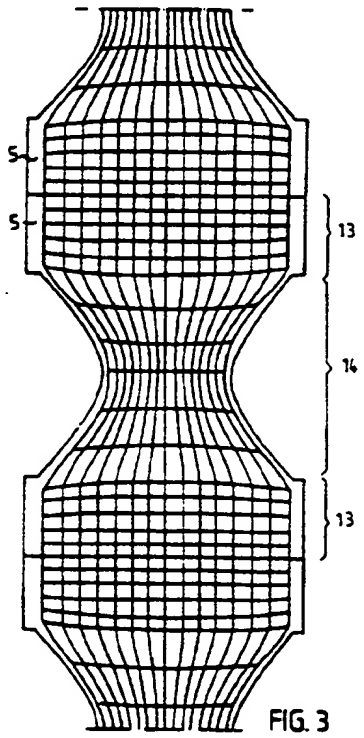

FIG. 3

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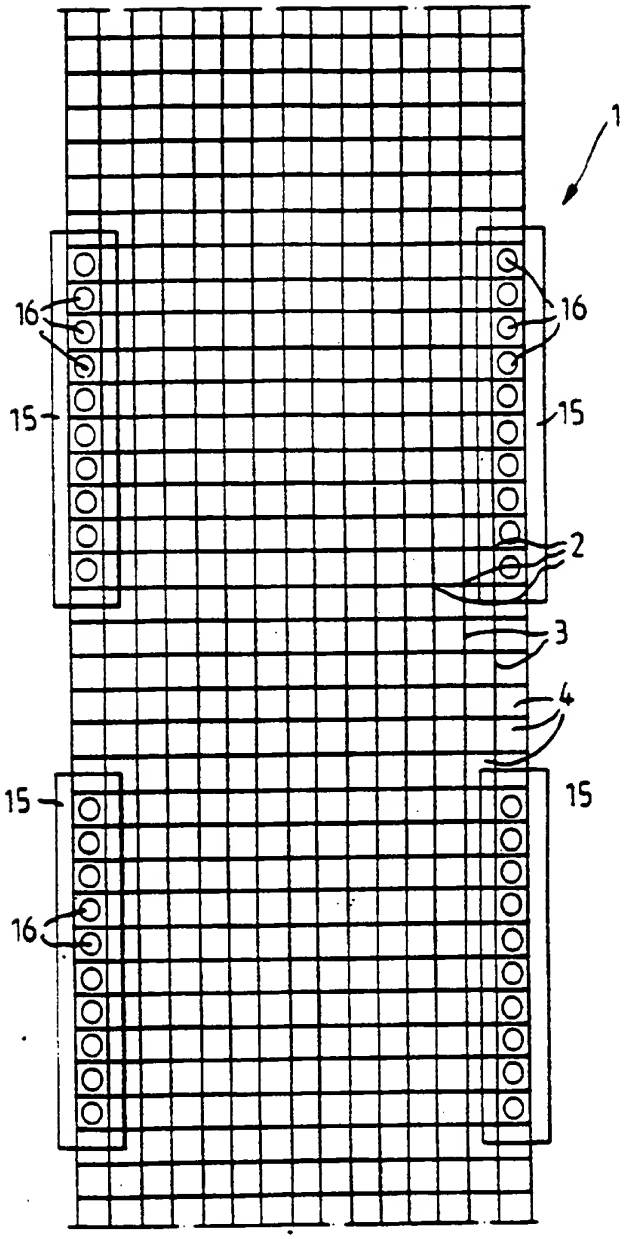

FIG.1

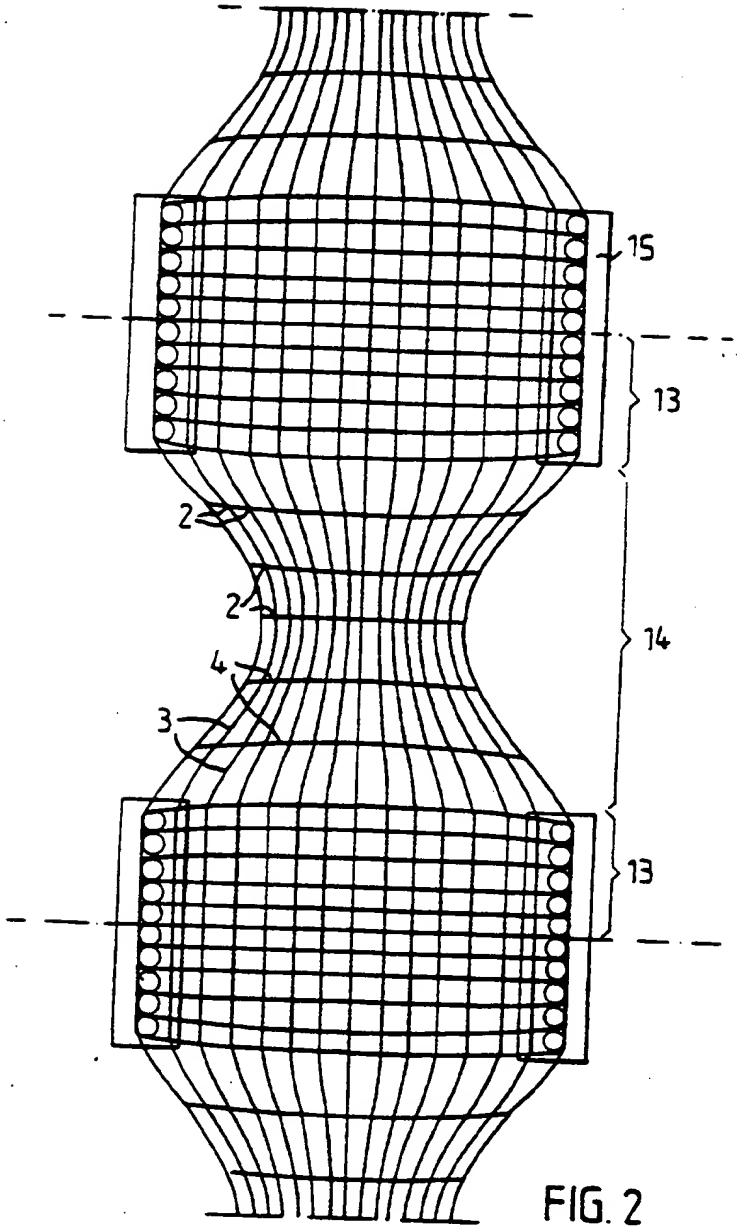

FIG. 2

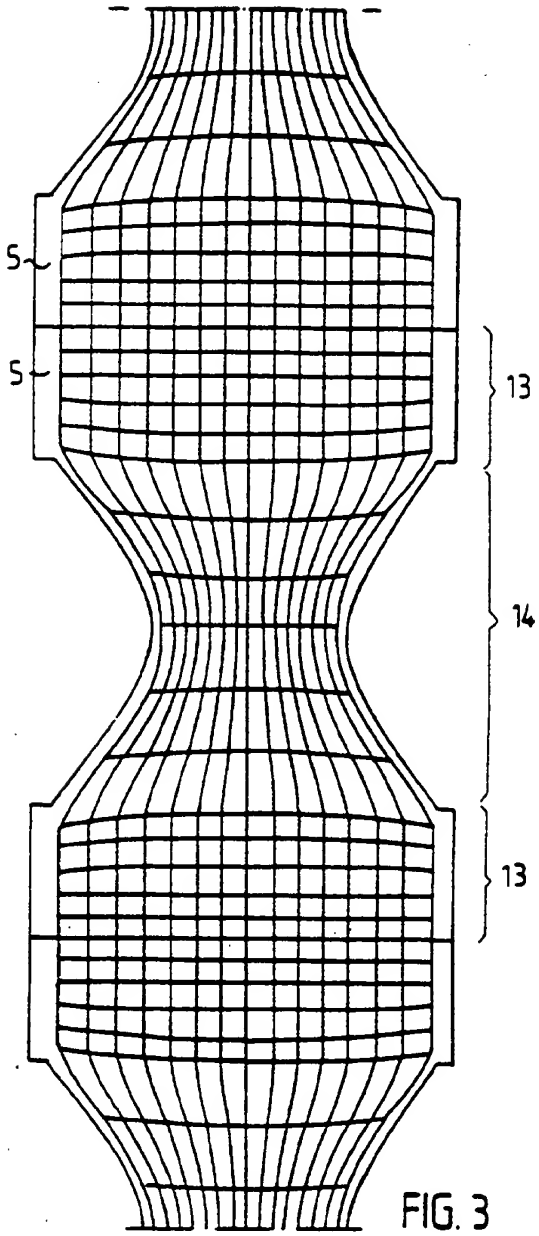

FIG. 3

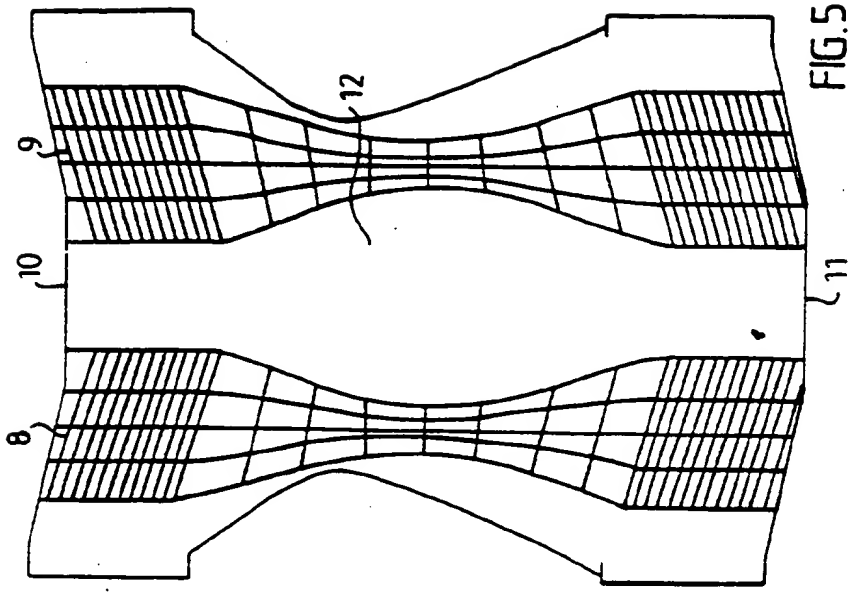

FIG.5

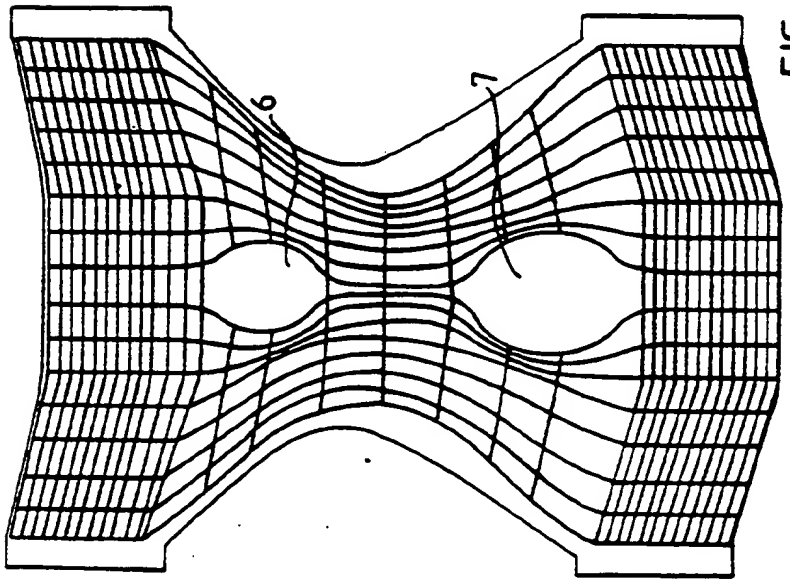

FIG.4

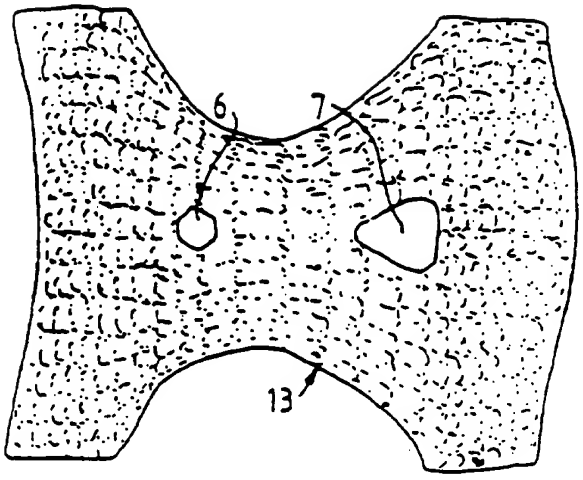

FIG.6

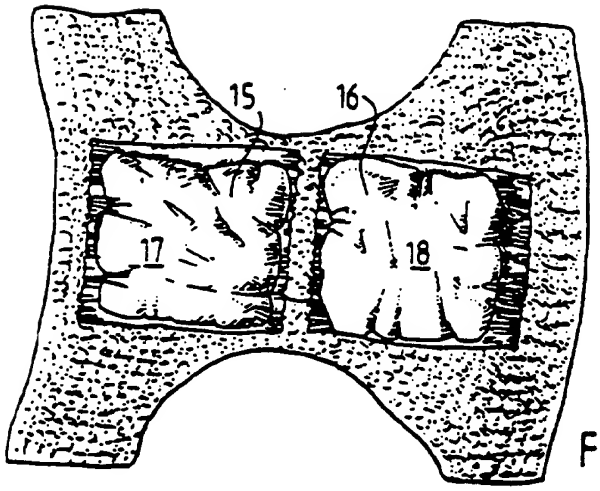

FIG.7

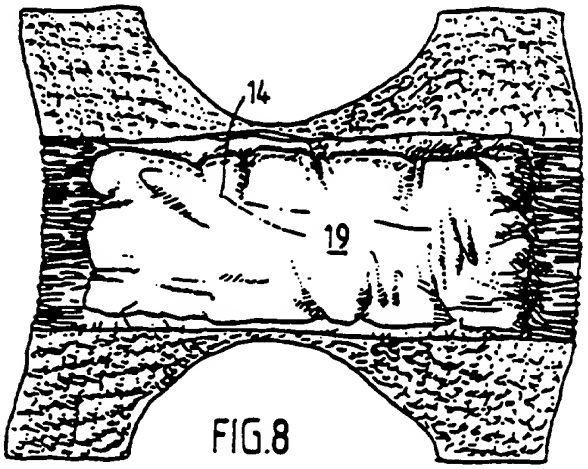

FIG.8

METHOD OF ELASTIFYING A SUBSTRATE BLANK

The present invention relates to a method of elastifying a substrate blank in accordance with the preamble to Claim 1. It also relates to an elastified substrate blank of the type described in the preamble to Claim 4.

Elastic net or film has been used to elastify pants type articles, such as diapers, pant diapers, sanitary briefs, incontinance garments etc. GB-A 2 248 380 describes for example a method for elastifying a pants type disposable article, whereby elastic threads are laid out in alternating straight sections and curved sections corresponding to the leg portions. Separate transverse elastic portions are laid in the waist sections. In general this is a very complicated procedure involving a number of steps and which are prone to malfunctioning. Nor is it possible according to this known method to elastify an entire pants type article to hold it securely in place against the body of the wearer.

WO 93/18729 describes the application of net elastic strips in straight lines, longitudinally to elastify the leg openings and transversely to elastify the waist portions. This is simpler than the above method but the straight leg opening elastic strips do not conform well to the wearers legs when worn. As in the above case, such elastification requires both transverse and longitudinal laying of the strips and the entire pants type article is not elastified, only the end and side edge portions.

These and other problems are avoided by the method of the above-mentioned type with the features specified in the characterizing clause of the attached Claim 1. The method according to the invention makes it possible to lay an elastic net in a simple and reliable manner so that a longitudinal section of a web of elastic netting or film with straight parallel sides will naturally assume the hour-glass shape of the diaper or pants substrate blank and can be afixed thereto. The longitudinally stretched intermediate crotch section will naturally assume the form of the leg openings providing elastic threads or elastified film por-

tions naturally conforming to the concave leg opening edges, thus providing security against leakage. The waist portions will also naturally assume a substantially straight edge configuration when a series of pants blanks are elastified end-to-end in a web.

According to a further development of the inventive method, apertures in said net or film can be provided in a very simple manner at the areas which will directly face the anus and the urethral opening when a diaper or pants diaper is worn, by making a simple slit at each desired location.

These and further advantages will become evident from the following detailed description with reference to the figures in the drawing of which:

Fig. 1 shows a web net which is elastic both longitudinally and laterally, and which is slipped in its untensioned state onto pegs mounted on carriages,

Fig. 2 shows the web net shown in Fig. 1 after the carriages have been separated from each other in accordance with the invention.

Fig. 3 shows the web net shown in Fig. 2 bonded to a pant-diaper substrate web after having been stretched, in accordance with the method of the present invention,

Fig. 4 shows a pant-diaper substrate blank made according to another variation of the method according to the invention and where longitudinal slits have been made in the net prior to bonding to the substrate,

Fig. 5 shows a pant-diaper substrate blank but where two parallel rectangular lengths of elastic net have been bonded to the substrate in accordance with the invention.

Fig. 6 shows a pant diaper substrate similar to that shown in Fig. 4 with an elastic net bonded to the substrate.

Fig. 7 shows the pant diaper substrate with net in accordance with Fig. 6 with an absorption unit fastened on the pant substrate.

Fig. 8 shows the pant substrate with net in accordance with Fig. 6 with an absorption unit of a second embodiment fastened to the pant substrate.

Fig. 1 shows a portion of a web net of indefinite length, delivered from a roll for example, which can be rubber or artificial resin fused at the interstices 2 between the longitudinal 3 and lateral 4 threads. In this case it is uniformly elastic both longitudinally and laterally. In other embodiments it can be advanntageous to have different elasticities in the longitudinal and transverse directions. Woven elastic threads can also be used, as well as elastic film, which can be regarded as an elastic net with infinitely small openings. Non-woven material such as elastomeric melt-blown material can also be used.

Fig. 2 shows a web net portion which has been stretched transversely but not longitudinally at the waist end portions 13 and longitudinally but not transversely in the intermediate crotch portion 14 therebetween. By so doing the originally rectangular length of elastic netting naturally assumes the hour-glass shape shown in the drawing and it can be easily bonded to the pant-diaper substrate. There will of course be both transverse as well as longitudinal tensions in the transitional portions between the waist and crotch portions, with the transverse tension gradually deceasing as one approaches the middle of the crotch portion.

The longitudinal threads 3 will follow the curved cut-out shape of the leg opening and provide an effective tight seal around the leg especially in combination with the cohesion provided by the transverse threads.

The size of the holes (in this case square holes) formed by the elastic threads is irrelevant. An elastic film, i.e.

infinitely small holes, will also assume the hour-glass shape.

Fig. 3 shows an elastic net after stretching, bonded to a pant-diaper substrate 5. This bonding can be achieved in a number of different ways, such as gluing, e.g. hot-melt adhesive, or heat sealing by ultrasonic bonding or heat calendering.

Fig. 4 shows the same pant-diaper but where the net has been slitted at two places longitudinally before bonding. Two holes 6 and 7 are thereby formed in the net corresponding to the pockets with absorbent material for collection of urine and feces respectively. Such an absorbent article is disclosed in co-pending Applications Nos. 9500385-1 and 9500386-9. Such slits are very easily made by cutting off a number of transverse threads when the net is in its stretched state. These transverse threads can also be pre-cut when the net is in its unstretched state. Certain of the transverse or longitudinal threads can be cut or pre-cut for other purposes as well, e.g. reconfiguring the hour-glass shape of the net.

Fig. 5 shows an alternative embodiment where two parallel rectangular lengths 8,9 of elastic net are stretched according to the inventive method the waist poritons are in this case slanted to confrom to the concave belly edge 10 and the convex back edge 11 of a diaper. A non-elastified central area 12 is left which can accomodate a central absorbent pocket.

By stretching the net or film transversely but not longitudinally in the waist portions and fixing the net or film to a non-elastic substrate, in this case the web constituting the pant-substrate blanks, there will be an elastic tension when the pant-type product is worn which acts circumferentially, holding the waist portion against the waist of the user but without any undesirable vertical tension there which could cause the waist portions to bunch up. The longitudinal

dimension of the waist portion will be fixed, thus avoiding problems with bunching or sagging in a diaper for example.

And in a corresponding manner, since the intermediate crotch portion is stretched longitudinally but not transversely and fixed to a substantially non-elastic substrate, it will, when assembled and worn, extert a tension cirrcumferentially around each leg,preventing leakage there. The longitudinally extended threads in the middle crotch region remote from the legs may be used to hold the absorbent material in place against the body of the user.

It may be advantageous to use an elastic thread material which retains a certain amount of extension permanently when stretched, i.e. permanent set.

The invention has been described above mainly in relation to an elastic net, but, as stated previously the invention can be executed as well using a plastic film. This plastic film can can be of varying properties to provide different performance in the finished pant-type product. For example, the film can either be elastic over its entire range of extensibility from its original unloaded state to its rupture point, or, as is the case with many thin films appropriate for this purpose, it may become elastic only after having been extended a certain amount, i.e. in the transverse direction for the waist portions, and in the longitudinal direction in the intermediate crotch portion. Or the elastic material used may be elastic up to a yield point and thereafter elastic but retaining a permanent elongation. This may be useful in creating optimum elasticity and shape of the final product.

The elastic material used can also have different elastic properties, for exammple different moduli of elasticity in the transverse and longitudinal directions to achieve desired elastic properties and shape in the final product.

It should also be obvious to the person skilled in the art that the invention is not only applicable to disposable pant-

type diapers and the like but to any type of elastic pants, both disposable and those designed to be washed and reworn many times.

Fig. 6 shows a pant 13 formed of a pant substrate of a non-woven material and an elastic net stretched as the elastic net described in connection with Fig. 2 and 3.

Fig. 7 shows an absorption unit 14, comprising of two part 15 and 16, where the first part 15 is arranged to cover the urine opening 6 in the pant 13 and where the second part 16 is arranged to cover the anal opening 7. The absorption part 15, comprising an outer liquid impermeable cover 17, fastened at its periphery against the pant.

The space outside said cover 17 may be filled with an absorbent, material, such as cellulosic fluff and/or absorbent gel.

The absorption part 16 for feces comprises an outer liquid impermeable cover 18 fastened at its periphery against the pant. The space inside the cover 18 is preferably empty as it is intended to keep feces inside the cover.

In Fig. 8 the absorption unit 14, covers both the urine opening 6 and the anal opening 7. The absorption unit may comprise absorbent material inside the cover 19.

The absorbent articles according to Fig. 7 and 8 can be modified. The important thing is in contrast to known absorbent article that a pant is formed which pant is in close contact with the users skin all over the pant and proximate the user's urethral opening and anus and that the absorption unit is arranged on the outside of the pant and held up by it.

The elastic pant can be designed with small holes 6, 7 because they are held in place and kept open by the elastic properties of the pant.

When feces or urine is excreted they will pass through their respective holes and into their respective pockets in the absorption unit.

The urine and feces collecting parts 15, 16 can be fastened to the pant tightly sealed to the portions of the elastic pant immediately surrounding the respective ones of said holes.

The front pocket, absorption part 15, may be filled and weighted down with urine without it pulling the elastic pant out of position in contact with the user. Since the two parts 15 and 16 are separated from each other the feces and urine will not mix, which is a known advantage to prevent irritation of the skin.

The cover 17 and 18 can be made of elastic material to be able to expand as they are filled with feces or urine. The cover 17 and 18 can also be folded as a bellows which expands as it is filled.

CLAIMS

1. Method of elastifying a substrate blank for use in an elastic pants type article, such as a diaper, a pant diaper, sanitary briefs, an incontinence garment or other elastic pants, said substrate blank having two wider waist portions at its ends in the longitudinal direction and a narrower crotch portion therebetween, characterised by applying and bonding to said substrate at least one elastic means which has elastic properties in the transverse and longitudinal directions of said blank;
stretching said elastic means (1) transversely but not longitudinally at said two waist portions (13);
stretching said elastic net, film or elastomeric non-woven material intermediate said two waist portions (13) longitudinally but not transversely at said crotch portion (14);
and then bonding said elastic means in its thus extended state to said substrate blank (5).

2. Method of elastifying a substrate blank in accordance with the method of Claim 1, characterised in that said elastic means is stretched and bonded to said substrate when still a part of a continuous rectilinear web of elastic net, film or elastomeric non-woven material, whereafter individual substrate pant-blanks are cut from said bonded web.

3. Method of elastifying a substrate blank in accordance with Claim 1, characterised by the following steps:
fixing, in their unstretched state to four individual movable carriage means (15) arranged rectangularly, four individual lateral edge lengths, two lengths on each lateral edge, said lengths corresponding to the waist area dimension in the longitudinal direction, of said elastic means which has rectilinear lateral edges in its unstretched state;
moving said four carriage means (15) away from each other while substantially retaining said rectangular arrangement;
thereafter bonding said elastic net, film or elastomeric non-woven material to said substrate in said stretched state.

4. Method of elastifying a substrate blank in accordance with one of the preceding claims, characterized in that said elastic net, film or elastomeric non-woven material is stretched beyond its yield point to retain a certain amount of permanent elongation.

5. Method of elastifying a substrate blank of a diaper or pant diaper in accordance with Claim 1,2 or 3, providing apertures in said net or film at the portion facing the anus and at the portion facing the urethral opening of the user when worn, characterized by making a single longitudinal slit in said net film, or non-woven material at the anus aperture and a single longitudinal slit in the net, film or non-woven material at the urethral opening aperture prior to bonding of the extended net, film or non-woven material to the substrate.

6. Elastified substrate blank intended for assembly into an elastic pants type article, such as a diaper, an incontinence garment, a pant diaper, sanitary briefs or other elastic pants, with wider waist portions at its ends in the longitudinal direction and a narrower crotch portion therebetween, characterized in that at least one elastic means which is elastic both longitudinally and transversely is bonded to said substrate, that said elastic means bonded to said substrate is elongated transversely but not longitudinally at said waist portions (13) and is elongated longitudinally but not transversely at said intermediate crotch portion (14), said elastic means being contracted towards the midpoint of the intermediate crotch portion (14).

7. Elastified substrate blank according to Claim 6, characterized in that said elastic means has different moduli of elasticity in its longitudinal and transverse directions.

8. Absorbent article, such as a diaper, an incontinance garment, a pant diaper or a sanitary napkin, characterized by a pant formed of an elastified substrate blank with wider waist portion at its ends and narrower crotch portion there

between, said substrate blank comprising at least one elastic means which is elastic both longitudinally and transversely and a substrate on which the elastic means is bonded, said elastic means is bonded to said substrate with the waist portions stretched transversely but not substantially longitudinally and with the crotch portion stretched longitudinally but not substantially transversely at said crotch portion, that said pant in use is intended to be in close contact with the users skin all over the pant and the users' urethral opening and anus, an absorption unit is arranged on the outside of the pant and is held up by the pant.

9. Absorbent article in the form of an elastic pants-type article, such as a diaper, incontinence garment, a pant diaper, sanitary briefs or other elastic pants assembled from an elastified substrate blank with one or more apertures in said elastic means at the portion facing the anus and the urethral opening of the user when worn, characterized by an absorbent unit for absorbing feces and/or urine of substantially smaller extent than the elastic pants type article.

10. Absorbent article according to claim 8 or 9, characterised in that the pants type article is provided with an aperture at the portion facing the anus and an aperture at the portion facing the urethral opening of the user when worn.

11. Absorbent article according to claim 10, characterized in that the absorbent unit consists of two separate portions, one for urine and one for faeces, said portions being arranged to surround the respective apertures in the elastic pants type article.

12. Absorbent article according to one of claims 8 - 11, characterized in the the absorbent unit contains absorbent material, such as fluff, absorbent foam, superabsorbent gels or a combination of these materials.

13. Absorbent article according to one of claims 8 - 12, characterized in that the absorbent unit consists of bag-like means fixed outside the apertures in the pants type article for receiving urine or faeces, respectively.

14. Absorbent article according to one of claims 8 - 13, characterised in that the absorbent unit is expandable in response to the bodily emissions.

15. Absorbent article according to claim 14, characterized in that the absorbent unit is limited by an outer liquid-impermeable material in the form of a bag or a jacket, and that said material is stretchable at normally occurring pressures in connection with the emission of urine and faeces.

16. Absorbent article according one of claims 8 - 15, characterised in that the pants type article can be opened and reclosed by means of fixing means, that the pants type article in its opened extended state is essentially hour-glass-shaped with a narrower crotch portion and wider waist portions and that the fixing means are fixing devices disposed on each of the lateral edges of the waist portions.

17. Absorbent article according to one of claims 8 - 16, characterised in that the pants type article consists of one or more supporting layers, suitably of fibers fabric, on which at least one elastic means is mounted in its stretched state to form the elastic of the pants type products, such as waist elastic and crotch elastic.

18. Absorbent article according to one of the preceding claims characterized in that said elastic means is an elastic net, elastic film or elastic non-woven material.

19. Method as claimed in claim 1 substantially as hereinbefore described with reference to any one of Figures 1 to 5 of the accompanying Drawings.

20. Absorbent article as claimed in claim 8 substantially as hereinbefore described with reference to the and as illustrated in Figure 6 or Figure 7 of the accompanying drawings.

The Patent Office

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Application No:	GB 9601631.6	**Examiner:**	Martin Davey
Claims searched:	1-8	**Date of search:**	17 April 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): A3V : V1B3B , V52 .

Int Cl (Ed.6): A41B , A61F

Other: Online : WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	GB2248380A	UNI-CHARM CORP.see whole document	1-8
A	WO93/12746 A1	MOLNLYCKE AB see Figs1 and 4 in particular	1-8

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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